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PATENT ABSTRACTS OF JAPAN

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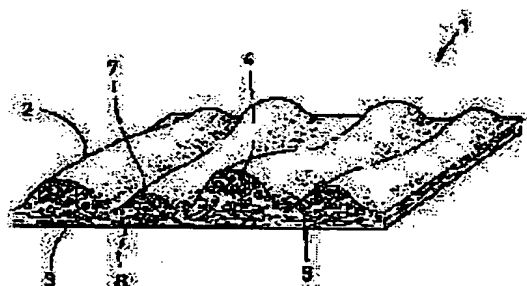
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(54) WIPER MADE FROM NONWOVEN FABRIC

(57)Abstract:

PURPOSE: To improve the stain-wiping performance and durability of a nonwoven fabric wiper having many projections.

CONSTITUTION: A web comprising thermally crimping hydrophobic synthetic fibers 7 and a web comprising hydrophilic fibers 8 are laminated to each other, and the produced laminated is jetted with high pressure water on a supporting roll having many fine projections and water drain holes on its smooth surface to interlace and rearrange the fibers 7, 8 with each other. The treated nonwoven fabric irregular in the distribution density of the fibers is subsequently heated to crimp the synthetic fibers 7 and then to obtain the nonwoven fabric wiper 1 wherein only the parts 4 having high densities are protruded.



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CLAIMS

[Claim(s)]

[Claim 1] A wiper made of a nonwoven fabric characterized by being obtained by manufacture method which consists of fibrin material, and has much boom hoisting at least on one side, and includes the following production process at least.

- a. A production process which obtains at least a layered product which consists of much more hydrophilic fiber web and a hydrophobic fiber web of heat crimp nature much more at least.
- b. The continuous plane section, and intermittent and a production process which obtains a nonwoven fabric which carries out a rearrangement and has unevenness in the direction of a field of said layered product at distribution density of fiber while injecting high-pressure water from a micropore nozzle to said layered product and carrying out the confounding of the fiber of said both webs on a support surface equipped with much heights and/or a crevice over which it is distributed independently, and many detailed drain holes.
- c. A production process to which it heat-treats and crimp of said synthetic fiber is carried out after dehydrating and/or drying said nonwoven fabric.

[Claim 2] A wiper according to claim 1 on which said wiper has average coefficient of friction (MIU) of 0.50-0.70.

[Claim 3] A wiper according to claim 2 whose mean deviation (MMD) of coefficient of friction of said wiper is 0.01-0.02.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the wiper and its manufacture method made of the nonwoven fabric used in order to wipe off dirt.

[0002]

[Description of the Prior Art] Conventionally, this seed wiper and its manufacture method are well-known. For example, according to U.S. Pat. No. 3,616,175, the web which consists of a rayon fiber is put on a wire mesh, high-pressure water can be injected from the micropore nozzle of this web upper part, the confounding of the fiber can be carried out mutually, and a nonwoven fabric similar to a natural chamois skin can be obtained. Moreover, according to JP,60-11148,B, the nonwoven fabric excellent in the surface friction property can be obtained by carrying out the laminating of the mat of the micro fiber which consists of the web and the thermoplastic polymer of the filament which consists of a thermoplastic polymer, carrying out heating pressurization of them intermittently, and joining. The pattern of the mesh remains in the field which was in contact with the wire mesh among both the surface, the striation which became depressed to the part which injected high-pressure water produces the former nonwoven fabric in another field, and they build comparatively detailed irregularity on each surface. Moreover, the confounding of the fiber is carried out mechanically and the touch of a nonwoven fabric is flexible to the whole. Since the portion which carried out heating pressurization welds the latter nonwoven fabric, it becomes thinner than other portions, serves as an impression and builds the concavo-convex large pattern of the difference of elevation on the surface, if dirt is wiped off with this nonwoven fabric, it will act so that that irregularity may scratch dirt.

[0003]

[Problem(s) to be Solved by the Invention] Although it has irregularity on the surface, since it makes detailed and is flexible, the nonwoven fabric to which the confounding of the fiber was carried out with high-pressure water among said conventional technology has the problem of being inferior to the operation which scratches dirt. Since the organization of the welded portion has the difference of elevation firm and large moreover, although the nonwoven fabric which, on the other hand, carried out heating pressurization of the thermoplastic polymer partially is excellent in the operation which scratches dirt, the welded portion loses the gestalt as fiber, and solidifies, and it has the problem of being inferior to the flexible touch.

[0004] Then, this invention builds the nonwoven fabric which injects high-pressure water to the fiber web containing heat crimp nature fiber, and has unevenness in fiber density, and makes it the technical problem to solve the problem of said conventional technology by heating and carrying out crimp of this nonwoven fabric by making finishing and this into a wiper on the surface which consists of much large boom hoisting of the difference of elevation comparatively.

[0005]

[Means for Solving the Problem] The place which this invention makes a means in order to solve said technical problem is as follows.

[0006] It is characterized by being obtained by manufacture method which that wiper made of a nonwoven fabric consists of fibrin material in this invention on the assumption that a wiper made

of a nonwoven fabric, and has much boom hoisting at least on one side, and includes the following production process at least.

- a. A production process which obtains at least a layered product which consists of much more hydrophilic fiber web and a hydrophobic fiber web of heat crimp nature much more at least.
- b. The continuous plane section, and intermittent and a production process which obtains a nonwoven fabric which carries out a rearrangement and has unevenness in the direction of a field of a layered product at distribution density of fiber while injecting high-pressure water from micropore NOSURU to said layered product and carrying out the confounding of the fiber of said both webs on a support surface equipped with much heights and/or a crevice over which it is distributed independently, and many detailed drain holes.
- c. A production process to which it heat-treats and crimp of said synthetic fiber is carried out after dehydrating and/or drying the nonwoven fabric.

[0007] In a mode with this desirable wiper, the average coefficient of friction (MIU) is 0.50–0.70, and mean deviation (MMD) of the coefficient of friction is 0.01–0.02 more preferably.

[0008]

[Function] Thus, in the constituted wiper made of a nonwoven fabric, if high-pressure water is injected to the layered product which consists of a web, while the configuration fiber of a layered product carries out a confounding mutually, a rearrangement can be carried out, it can be relatively accumulated mostly into the perimeter of the heights of a base material, and/or a crevice, and the flexible nonwoven fabric which has unevenness in the distribution density of fiber along the direction of a field of a base material can be obtained. If this nonwoven fabric is heat-treated and crimp of the synthetic fiber is carried out, when many synthetic fibers carry out crimp relatively, the portion with high density will upheave highly compared with a portion with low density, and will form large boom hoisting of the difference of elevation further from boom hoisting which existed in the nonwoven fabric surface at the beginning.

[0009] With this wiper made of a nonwoven fabric, the synthetic fiber which is accumulated on the ridge and which carried out crimp does not lose rigidity in a damp or wet condition, either, and a ridge is not destroyed completely easily.

[0010]

[Example] It is as follows when it explains with reference to the drawing of attachment of the details of the wiper made of a nonwoven fabric concerning this invention.

[0011] Drawing 1 is the typical partial fracture perspective diagram in which expanding a wiper 1 partially and showing it. A wiper 1 has the upper surface 2 and an inferior surface of tongue 3, the upper surface 2 has much boom hoisting which consists of an indeterminate form ridge 4 and a trough [indeterminate form / between ridges 4] 5, and its inferior surface of tongue 3 is flat. While there are many synthetic fibers 7 of the hydrophobicity which is in a crimp condition on the about two upper surface so that clearly [in the cross section of a wiper 1] relatively, many [relatively and] rayon fibers 8 of the shape of direct and the hydrophilicity crooked gently exist in about three inferior surface of tongue and each fiber carries out the confounding of a synthetic fiber 7 and the rayon fiber 8 mechanically, a synthetic fiber 7 and a rayon fiber 8 carry out a confounding mutually, and fiber 7 and 8 forms the nonwoven fabric by it. fiber 7 and 8 — each distribution density (number of the fiber per unit area of a nonwoven fabric) is higher than a trough 5 in a ridge 4.

[0012] This wiper 1 carries out impregnation of water or the drug solution beforehand, and turns and uses the upper surface 2 for objects, such as a table and a wall surface. If water etc. is held at the rayon fiber of hydrophilicity and the force is applied to a wiper 1, it will exude gradually and will make wiping of dirt smooth. The ridge 4 of the upper surface 2 acts so that the dirt of an object may be scratched, and a trough 5 acts as passage for discharging the scratched dirt out of a wiper 1 with water etc. Since it consists of that the hydrophobic synthetic fiber 7 mainly becomes entangled mechanically, although a wiper 1 contains water, a ridge 4 does not fall and does not destroy the rigidity completely easily. Therefore, this wiper 1 has the scraping effect high from beginning to end and the discharge effect of dirt.

[0013] Drawing 2 and 3 are the typical expansion end view showing other embodiments of a wiper 1. The wiper 1 of drawing 2 has a ridge 4 and a trough 5 to the vertical side 2 and 3 each,

and has the synthetic fiber 7 which carried out crimp near the vertical sides 2 and 3 of a ridge 4, and there is a rayon fiber 8 in the middle of the vertical sides 2 and 3. In addition, in a ridge 4, any fiber 7 and 8 of that distribution density is high, being constituted with the synthetic fiber 7 in which the ridge 4 mainly carried out crimp, and fiber 7 and 8 carrying out a confounding mechanically, and forming the nonwoven fabric is the same as that of the mode of drawing 1. Although the wiper 1 of drawing 3 has a ridge 4 and a trough 5 in the vertical sides 2 and 3 like it of drawing 2, it differs in that have a rayon fiber 8 near the vertical sides 2 and 3 of a ridge 4, and it has a synthetic fiber 7 in the middle of the vertical sides 2 and 3. There is an advantage that exudation of the water from the vertical sides 2 and 3 becomes prompt in this wiper 1, and since the synthetic fiber 7 which carried out crimp has accomplished the nucleus, the mold collapse of the ridge 4 is not carried out easily. In addition, in drawing 2 and 3, although those locations of trough 5 [ridge 4 of the vertical sides 2 and 3 and] correspond mostly, even if they are not in agreement, it is convenient to the function of a wiper 1.

[0014] Drawing 4 is the mimetic diagram showing the manufacturing process of the wiper 1 shown in drawing 1. This production process consists of the web supply production process 50, the impregnation production process 51, the first high-pressure water treatment production process 52, the second high-pressure water treatment production process 53, the dehydration desiccation production process 54, a heat treatment process 55, and a winding production process 56.

[0015] the endless belt 60 top it runs rightward [of drawing] in the web supply production process 50 — the — the web 62 of 1 random Weber 61 to hydrophilic fiber 8 — continuous — supplying — continuing — a web 62 top — the — the web 64 of the hydrophobic synthetic fiber 7 of heat crimp nature is continuously supplied from 2 random Weber 63, and the web layered product 65 which consists of both webs 62 and 64 is built.

[0016] In the impregnation production process 51, from the upper part, a stream 66 is gently supplied to the whole width of face of a layered product 65, and carries out impregnation to it, and carrying out smoothly of transit of a layered product 65 is attained by making the conditions settle down.

[0017] In the first high-pressure water treatment production process 52, it has the micropore for wastewater with a diameter of 0.2–2.0mm for a layered product 65 at 5 – 50% of rate of area in a smooth peripheral surface. It leads to the 1st support roll 67 which rotates to the right, and from the injection nozzle 68 of a large number installed successively to the cross direction and the hoop direction of a roll 67, 20–100kg/cm² high-pressure water is injected at a rate of 0.5 – 20 l/m², and the confounding of the fiber 7 and 8 which constitutes a layered product 65 is carried out mechanically mutually. The suction means (not shown) for urging wastewater is formed in the 1st support roll 67 interior.

[0018] In the second high-pressure water treatment production process 53, the layered product 65 which carried out the confounding with the 1st support roll 67 is drawn after the 2nd support roll 69 of the RRC which has a hemispherical projection with a diameter [of 0.3–15mm], and a height of 0.4–10mm in the pitch of 1–15mm in a smooth peripheral surface, and has a drain hole with a diameter of 0.2–2.0mm at 2 – 35% of rate of area. This layered product 65 is preferably processed with the water jet of high pressure and high water supply amounts rather than it like said production process 52 by nozzle 69A, from the point of said hemispherical projection, to the perimeter of the end face section, it moves and the rearrangement of the fiber 7 and 8 is carried out. By doing so, many pile up the perimeter of the end face section, and fiber 7 and 8 becomes thin by the point, and forms the nonwoven fabric 70 which has unevenness in the distribution density of fiber in the direction of a plane. In the field which a part of surface of a roll 69 was copied in the field where the nonwoven fabric 70 contacted the 2nd support roll 69, and injected high-pressure water, the striation which became depressed to the injection part arises, and these are building small boom hoisting of the difference of elevation on both the surfaces.

[0019] In addition, with the technical contents of the indication to JP,62-125058,A concerning the same applicant as this application, since the details of the production process from the impregnation production process 51 to the second high-pressure water treatment production process 53 are substantially the same, they omit the explanation.

0020] Next, at the desiccation production process 54, the suction by the vacuum is made to act on the nonwoven fabric 70 which is in a damp or wet condition at the front production process 53, and it dehydrates, and warm air is sent further and it dries.

0021] In a heat treatment process 55, a nonwoven fabric 70 is heated even to even whenever ***** <DP N=0004>], and crimp of the synthetic fiber 7 upheaves by the crimp, a nonwoven fabric 70 serves as the ridge 4 of drawing 1, the thin portion of fiber 7 hardly upheaves, serves as a trough 5, and Ryobe 4 and 5 forms boom hoisting which has the big difference of elevation which cannot acquire production processes 50-54. Since a nonwoven fabric 70 is mainly concerned with a synthetic fiber 7 and it exists in the upper surface 2, a ridge 4 and a trough 5 are also mainly formed in the upper surface 2. After this nonwoven fabric's 70 serving as an original fabric of a wiper 1 and rolling it round at the following production process 56, it is cut out and used for a necessary size.

[0022] In such a manufacturing process, in order to obtain the more desirable wiper 1, the common knowledge bicomponent fiber of the side-by-side mold which consists of synthetic resin which is two kinds from which heat shrink temperature is different as a hydrophobic synthetic fiber 7, or a sheath-core mold is used in 20 - 80% of the weight of the range of a nonwoven fabric 70, and natural fibers, such as a rayon fiber and grinding pulp, the synthetic fiber which carried out hydrophilization processing are used as hydrophilic fiber 8 in 80 - 20% of the weight of the range of a nonwoven fabric 70. Moreover, for a synthetic fiber 7 or hydrophilic fiber 8, 30 % of the weight is [the 3rd fiber from which they and a property differ] mixable as a limit. For example, the non-crimp nature synthetic fiber which hits a synthetic fiber 7 to 30% of the weight of them is mixable. A wiper 1 combines a synthetic fiber 7 and hydrophilic fiber 8 so that the basis weight may serve as 30 - 200 g/m², and average coefficient of friction (MIU) of a wiper 1 is 0.50-0.70, and it selects the fineness of these fiber 7 and 8, the degree of crimp, and an operating rate so that the mean deviation (MMD) of coefficient of friction may fit in the range of 0.01-0.02 preferably. Here, MIU is a slipping hard index, MMD is the index of a rough deposit, and they are explained by the Textile Machinery Society of Japan issue ("standardization and analysis" (the 2nd edition) of aesthetic property evaluation) in full detail. The wiper 1 which has this numerical property is excellent in especially the engine performance that scratches dirt.

[0023] In addition, although drawing 4 explained the layered product 65 of the two-layer structure which consists of webs 62 and 64, another web can be further put on one of webs, and the layered product 65 which consists of three layers as a whole can also be used as a wiper 1. Moreover, at the second high-pressure water treatment production process 53, it can change to a hemispherical projection and a detailed crevice can also be established in the surface of the 2nd support roll 69. In this case, while the configuration fiber of the layered product 65 which had high-pressure water injected is flowed in and accumulated into that crevice, it becomes thin in respect of [of a roll 69] smooth.

[0024] [Effect of the Invention] Since the wiper concerning this invention has configuration fiber made of the nonwoven fabric which carried out the confounding mechanically, its touch is flexible. In the surface, since it has much large boom hoisting of the difference of elevation comparatively, dirt can be efficiently scratched by the ridge. Since it consists of synthetic fibers which mainly carried out crimp and the fiber does not lose rigidity in a damp or wet condition, either, this ridge is not destroyed completely simply.

[0025] This wiper gives unevenness to the distribution density of the hydrophobic synthetic fiber of heat crimp nature, and since it forms boom hoisting by carrying out crimp of the synthetic fiber, it can acquire large boom hoisting of the difference of elevation easily further rather than boom hoisting which can be acquired by the nonwoven fabric manufacturing process.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The typical expansion perspective diagram of a wiper.

[Drawing 2] End view of a wiper showing an example of an embodiment.

[Drawing 3] End view of a wiper showing other examples of an embodiment.

[Drawing 4] The mimetic diagram of the manufacturing process of a wiper.

[Description of Notations]

- 1 Wiper
- 2 Upper Surface
- 3 Inferior Surface of Tongue
- 4 Ridge
- 5 Trough
- 7 Hydrophobic Crimped Staple
- 8 Hydrophilic Fiber
- 62 Web
- 64 Web
- 65 Layered Product
- 67 1st Support Roll
- 69 2nd Support Roll
- 70 Nonwoven Fabric

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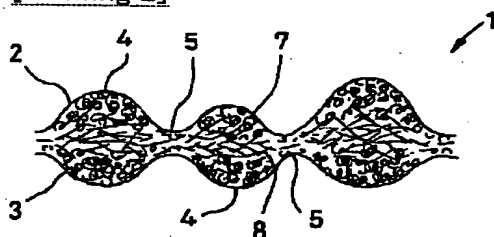
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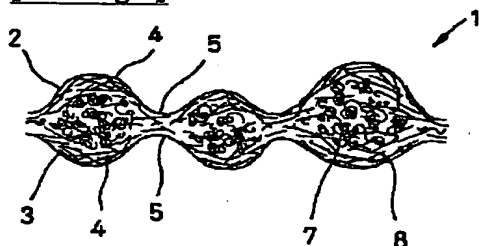
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DRAWINGS

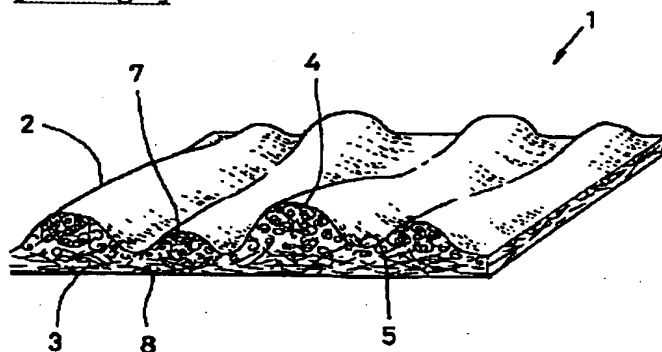
[Drawing 2]



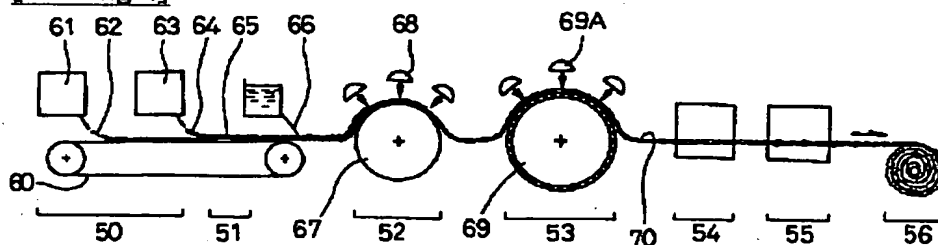
[Drawing 3]



[Drawing 1]



[Drawing 4]



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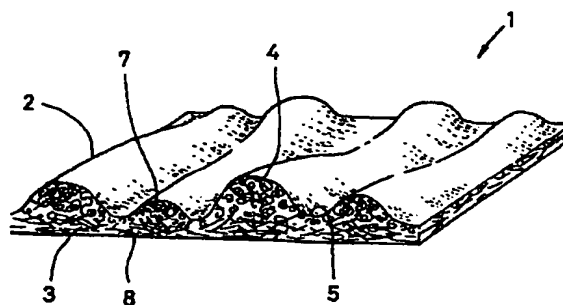
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(54) 【発明の名称】 不織布製ワイパー

(57) 【要約】

【目的】 多数の起伏を有する不織布製ワイパーの汚れを掻き取る性能と耐久性とを向上させる。

【構成】 熱捲縮性の疎水性合成繊維7からなるウェブと親水性繊維8からなるウェブとを重ね合わせて積層体をつくり、平滑面上に多数の微細な突起と排水孔とを有する支持ロール上においてその積層体に高圧水を噴射し、繊維7、8を交絡させるとともに再配列し、繊維の分布密度にむらのある不織布をつくる。この不織布を加熱して合成繊維7を捲縮させることにより、密度の高い部分のみを隆起させて不織布製ワイパー1を得る。



【特許請求の範囲】

【請求項1】繊維素材からなり、少なくとも片面に多数の起伏を有し、かつ少なくとも次の工程を含む製造方法によって得られることを特徴とする不織布製ワイパー。

a. 少なくとも一層の親水性繊維ウェブと、少なくとも一層の熱捲縮性の疎水性繊維ウェブとからなる積層体を得る工程。

b. 連続した平面部と、間欠的かつ独立して分布する多数の凸部および／または凹部と、多数の微細排水孔とを備えた支持体表面上において、前記積層体に微細孔ノズルから高圧水を噴射し、前記両ウェブの繊維を交絡させるとともに再配列して前記積層体の面方向に繊維の分布密度にむらを有する不織布を得る工程。

c. 前記不織布を脱水および／または乾燥したのち、熱処理して前記合成繊維を捲縮させる工程。

【請求項2】前記ワイパーが0.50～0.70の平均摩擦係数(MIU)を有する請求項1記載のワイパー。

【請求項3】前記ワイパーの摩擦係数の平均偏差(MMD)が0.01～0.02である請求項2記載のワイパー。

【発明の詳細な説明】

【0001】

【産業上の利用分野】この発明は、汚れを拭き取るために使用する不織布製のワイパーとその製造方法に関する。

【0002】

【従来の技術】従来、この種ワイパーとその製造方法は、公知である。例えば、米国特許第3,616,175号によれば、レーヨン繊維からなるウェブをワイヤーメッシュに載せ、該ウェブ上方の微細孔ノズルから高圧水を噴射して繊維を互いに交絡させ、天然セーム皮に類似の不織布を得ることができる。また、特公昭60-11148号公報によれば、熱可塑性重合体からなるフィラメントのウェブと熱可塑性重合体からなるマイクロファイバーのマットとを積層し、それらを間欠的に加熱加圧して接合することにより表面の摩擦特性に優れた不織布を得ることができる。前者の不織布は、その両表面のうちワイヤーメッシュに接していた面にはそのメッシュの模様が残り、もう一方の面には高圧水を噴射した部位にくぼんだ条痕が生じて、それらが各表面に比較的微細な凹凸をつくる。また、繊維は機械的に交絡し、不織布は全体に肌触りが柔軟である。後者の不織布は、加熱加圧した部分が融着してその他の部分よりも薄くなってくぼみとなり、表面に高低差の大きい凹凸模様をつくるから、この不織布で汚れを拭き取ると、その凹凸が汚れを掻き取るように作用する。

【0003】

【発明が解決しようとする課題】前記従来技術のうち、高圧水で繊維を交絡させた不織布は、表面に凹凸を有するものの、それが微細にして柔軟であるから、汚れを掻

き取る作用に劣るという問題がある。一方熱可塑性重合体を部分的に加熱加圧した不織布は、融着した部分の組織が強固であってしかも大きい高低差を有するから汚れを掻き取る作用に優れているものの、融着した部分が繊維としての形態を失って固化してしまい、柔軟な肌触りに劣るという問題がある。

【0004】そこで、この発明は、熱捲縮性繊維を含む繊維ウェブに高圧水を噴射して繊維密度にむらのある不織布をつくり、この不織布を加熱して捲縮させることにより多数の比較的高低差の大きい起伏からなる表面に仕上げ、これをワイパーとすることによって前記従来技術の問題を解決することを課題にしている。

【0005】

【課題を解決するための手段】前記課題を解決するためにこの発明が手段とするところは、以下のとおりである。

【0006】この発明においては不織布製ワイパーを前提とし、その不織布製ワイパーが繊維素材からなり、少なくとも片面に多数の起伏を有し、かつ少なくとも次の工程を含む製造方法によって得られることを特徴としている。

a. 少なくとも一層の親水性繊維ウェブと、少なくとも一層の熱捲縮性の疎水性繊維ウェブとからなる積層体を得る工程。

b. 連続した平面部と、間欠的かつ独立して分布する多数の凸部および／または凹部と、多数の微細排水孔とを備えた支持体表面上において、前記積層体に微細孔ノズルから高圧水を噴射し、前記両ウェブの繊維を交絡させるとともに再配列して積層体の面方向に繊維の分布密度にむらを有する不織布を得る工程。

c. その不織布を脱水および／または乾燥したのち、熱処理して前記合成繊維を捲縮させる工程。

【0007】かかるワイパーの好ましい態様においては、その平均摩擦係数(MIU)が0.50～0.70であって、より好ましくは、その摩擦係数の平均偏差(MMD)が0.01～0.02である。

【0008】

【作用】このように構成した不織布製ワイパーにおいては、ウェブからなる積層体に高圧水を噴射すると、積層体の構成繊維が互いに交絡するとともに再配列して支持体の凸部の周囲および／または凹部の中に相対的に多く集積し、支持体の面方向に沿って繊維の分布密度にむらのある柔軟な不織布を得ることができる。この不織布を熱処理して合成繊維を捲縮させると、密度の高い部分は相対的に多くの合成繊維が捲縮することにより、密度の低い部分に比べて高く隆起し、不織布表面に当初存在した起伏よりさらに高低差の大きい起伏を形成する。

【0009】かかる不織布製ワイパーでは、その隆起部に集積している捲縮した合成繊維が湿潤状態でも剛性を失うことがなく、隆起部は容易に潰滅することがない。

【0010】

【実施例】この発明に係る不織布製ワイバーの詳細を添付の図面を参照して説明すると、以下のとおりである。

【0011】図1は、ワイバー1を部分的に拡大して示す模式的な部分破断斜視図である。ワイバー1は、上面2と下面3とを有し、上面2は不定形な隆起部4と隆起部4間の不定形な谷部5とからなる多数の起伏を有し、下面3は平坦である。ワイバー1の断面で明らかなように、上面2近傍には捲縮状態にある疎水性の合成繊維7が相対的に多く、下面3近傍には直状またはゆるやかに屈曲する親水性のレーヨン繊維8が相対的に多く存在し、合成繊維7とレーヨン繊維8とは各々の繊維どうしが機械的に交絡するとともに、合成繊維7とレーヨン繊維8とが互いに交絡し、それによって繊維7、8は不織布を形成している。繊維7、8各々の分布密度（不織布の単位面積当たりの繊維の本数）は谷部5よりも隆起部4において高い。

【0012】かかるワイバー1は、水や薬液を予め含浸させ、上面2をテーブルや壁面などの対象物に向けて使用する。水などは、親水性のレーヨン繊維に保持され、ワイバー1に力を加えると徐々に滲出して汚れの拭き取りを円滑にする。上面2の隆起部4は、対象物の汚れを掻き取るように作用し、谷部5は、掻き取った汚れを水などと共にワイバー1の外へ排出するための流路として作用する。隆起部4は、主として疎水性の合成繊維7が機械的に絡みあうことで構成されているから、ワイバー1が水を含んでもその剛性は低下することがなく、また容易に潰滅することもない。したがって、このワイバー1は、終始高い掻き取り効果と汚れの排出効果とを有する。

【0013】図2、3は、ワイバー1の他の実施態様を示す模式的な拡大端面図である。図2のワイバー1は、上下面2、3各々に隆起部4と谷部5とを有し、隆起部4の上下面2、3の近傍には捲縮した合成繊維7があり、上下面2、3の中間にレーヨン繊維8がある。なお、隆起部4において、いずれの繊維7、8も分布密度が高いこと、隆起部4が主として捲縮した合成繊維7によって構成されていること、繊維7、8が機械的に交絡して不織布を形成していることは、図1の態様と同じである。図3のワイバー1は、図2のそれと同様に上下面2、3に隆起部4と谷部5とを有するが、隆起部4の上下面2、3の近傍にレーヨン繊維8を有し、上下面2、3の中間に合成繊維7を有する点が異なる。このワイバー1には、上下面2、3からの水の滲出が速やかになるという利点があり、また、隆起部4は、捲縮した合成繊維7が核を成しているから、容易に型崩れすることがない。なお、図2、3において、上下面2、3の隆起部4どうし、谷部5どうしは、それらの位置がほぼ一致しているが、それらが一致していなくてもワイバー1の機能に支障はない。

【0014】図4は、図1に示したワイバー1の製造工程を示す模式図である。この工程は、ウェブ供給工程50、含浸工程51、第1次高圧水処理工程52、第2次高圧水処理工程53、脱水乾燥工程54、熱処理工程55、および巻取工程56からなる。

【0015】ウェブ供給工程50においては、図の右方向へ走行する無端ベルト60の上に第1ランダムウェブ61から親水性繊維8のウェブ62を連続的に供給し、続いてウェブ62の上に第2ランダムウェブ63から熱捲縮性の疎水性合成繊維7のウェブ64を連続的に供給し、両ウェブ62、64からなるウェブ積層体65をつくる。

【0016】含浸工程51においては、積層体65の幅全体に上方から流水66をゆるやかに供給して含浸させ、その地合いを落ち着かせることにより積層体65の走行の円滑化を図る。

【0017】第1次高圧水処理工程52においては、積層体65を平滑な周面に直径0.2～2.0mmの排水用微細孔を5～50%の面積率で有し、右へ回転する第1支持ロール67へ導き、ロール67の幅方向と周方向とに列設した多数の噴射ノズル68から、20～100kg/cm²の高圧水を0.5～20l/m²の割合で、噴射し、積層体65を構成する繊維7、8を互いに機械的に交絡させる。第1支持ロール67内部には、排水を促すためのサクション手段（図示せず）が設けてある。

【0018】第2次高圧水処理工程53においては、平滑な周面に直径0.3～1.5mm、高さ0.4～1.0mmの半球状突起を1～1.5mmのピッチで有し、かつ、直径0.2～2.0mmの排水孔を2～35%の面積率で有する右回転の第2支持ロール69の上に第1支持ロール67で交絡した積層体65を導く。この積層体65をノズル69Aにより前記工程52と同様に、ただし、好ましくはそれよりも高圧かつ高給水量の噴射水で処理して繊維7、8を前記半球状突起の先端部から基端部周囲へと移動、再配列させる。そうすることにより、繊維7、8は、その基端部周囲に多くが集積して、先端部で希薄となり、平面方向に繊維の分布密度にむらを持つ不織布70を形成する。不織布70が第2支持ロール69に接触した面にはロール69の表面が一部分写しとられ、高圧水を噴射した面には噴射部位にくぼんだ条痕が生じ、これらが両表面に高低差の小さい起伏をつくっている。

【0019】なお、含浸工程51から第2次高圧水処理工程53に至る工程の詳細は、本願と同一の出願人に係る特開昭62-125058号公報に開示の技術内容と実質的に同じであるから、その説明を割愛する。

【0020】次に、乾燥工程54では、前の工程53で湿潤状態にある不織布70に真空によるサクションを作用させて脱水し、さらに温風を送って乾燥する。

50 【0021】熱処理工程55では、不織布70を所要温

度にまで加熱し、熱捲縮性の合成繊維7を捲縮させる。不織布70は、その捲縮によって、合成繊維7の集積している部分が隆起して図1の隆起部4となり、繊維7の希薄な部分は殆ど隆起することがなく谷部5となって、両部4、5は工程50～54までは得ることのできない大きな高低差を有する起伏を形成している。合成繊維7は、不織布70の主として上面2に存在するから、隆起部4と谷部5も主として上面2に形成される。かかる不織布70は、ワイバー1の原反となるものであって、次の工程56で巻き取った後、所要寸法に裁断して使用する。

【0022】このような製造工程において、より好ましいワイバー1を得るには、疎水性の合成繊維7として熱収縮温度が違う2種類の合成樹脂からなるサイド・バイ・サイド型、または芯鞘型の周知複合繊維を不織布70の20～80重量%の範囲で使用し、親水性繊維8としては、レーヨン繊維や粉碎バルブなどの天然繊維、親水化処理した合成繊維などを不織布70の80～20重量%の範囲で使用する。また、合成繊維7や親水性繊維8には、それらと性質の異なる第3の繊維を30重量%を限度として混合することができる。例えば、合成繊維7にその中の30重量%に当る非捲縮性合成繊維を混合することができる。ワイバー1は、その坪量が30～200g/m²となるように合成繊維7と親水性繊維8とを組み合わせ、ワイバー1の平均摩擦係数(MIU)が0.50～0.70であって、好ましくは摩擦係数の平均偏差(MMD)が0.01～0.02の範囲におさまるようにそれら繊維7、8の織度や捲縮の程度、使用割合を選定する。ここで、MIUは滑りにくさの指標であり、MMDはざらつきの指標であって、それらは日本繊維機械学会発行「風合い評価の標準化と解析」(第2版)に詳述されている。かかる数値特性を有するワイバー1は、汚れを掻き取る性能が特に優れている。

【0023】なお、図4では、ウェブ62と64とからなる二層構造の積層体65について説明したが、いずれか一方のウェブにもう一方のウェブをさらに重ね、全体として三層からなる積層体65をワイバー1にすること*

もできる。また、第2次高圧水処理工程53では、第2支持ロール69の表面に半球状突起に替えて微細な凹部を設けることもできる。この場合には、高圧水を噴射された積層体65の構成繊維が、その凹部の中へ流れ込んで集積する一方、ロール69の平滑面では希薄になる。

【0024】

【発明の効果】この発明に係るワイバーは、構成繊維が機械的に交絡した不織布でできているから、肌触りが柔軟である。その表面には、多数の比較的高低差の大きい起伏を有するから、その隆起部で効率よく汚れを掻き取ることができる。かかる隆起部は、主として捲縮した合成繊維で構成されており、その繊維が湿润状態でも剛性を失うことがないから、簡単に潰滅することがない。

【0025】かかるワイバーは、熱捲縮性の疎水性合成繊維の分布密度にむらをもたせ、その合成繊維を捲縮させることで起伏を形成するから、不織布製造工程で得ることができる起伏よりもさらに高低差の大きい起伏を容易に得ることができる。

【図面の簡単な説明】

【図1】ワイバーの模式的な拡大斜視図。

【図2】実施態様の一例を示すワイバーの端面図。

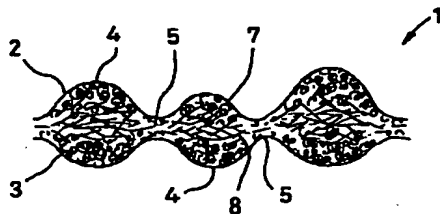
【図3】実施態様の他の一例を示すワイバーの端面図。

【図4】ワイバーの製造工程の模式図。

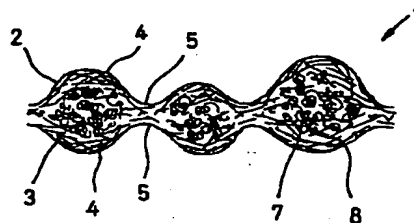
【符号の説明】

- 1 ワイバー
- 2 上面
- 3 下面
- 4 隆起部
- 5 谷部
- 7 疎水性捲縮繊維
- 8 親水性繊維
- 62 ウェブ
- 64 ウェブ
- 65 積層体
- 67 第1支持ロール
- 69 第2支持ロール
- 70 不織布

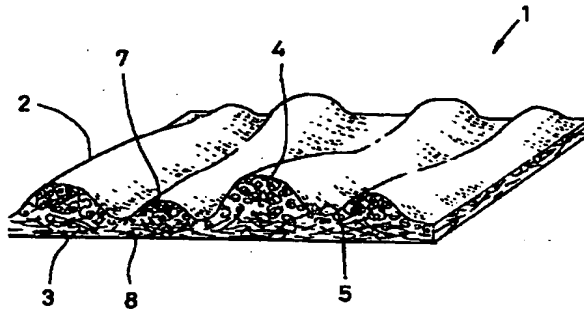
【図2】



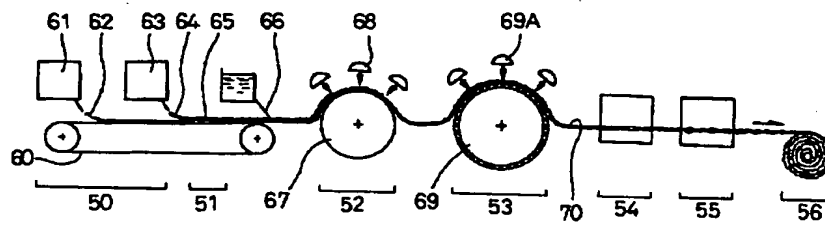
【図3】



【図1】



【図4】



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